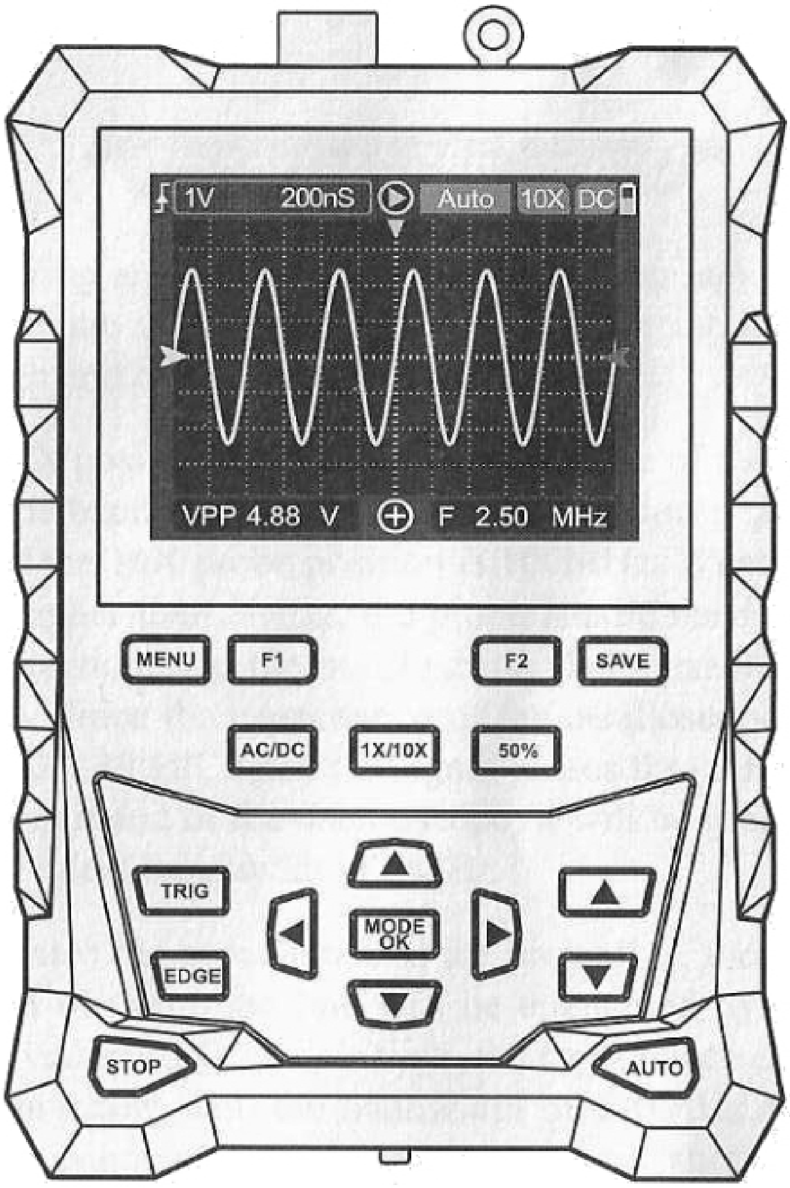

1V
200nS
Auto
10X
DC
VPP 4.88 V
F 2.50 MHz
MENU
F1
F2
SAVE
AC/DC
1X/10X
50%
TRIG
MODE
OK
EDGE
STOP
AUTO

# USER MANUAL

## Contents



## Important Reminders

When measuring an unknown voltage, the probe handle should first be toggled to the 10X position to prevent the input voltage from being too high and burning out the oscilloscope.

The 1X or 10X position is determined by the size of the voltage being measured. The bandwidth of the 1X probe position is 5MHz, and the bandwidth of the 10X probe position is 100MHz. When measuring at frequencies higher than 5MHz, the probe handle needs to be toggled to the 10X position, and the oscilloscope also needs to be set to the 10X position. Since the capacitance of the oscilloscope probe line is as high as 100 ~ 300pF, when the signal passes through the probe and reaches the input end of the oscilloscope, it will be greatly attenuated with the equivalent bandwidth of 5MHz.

In order to match the capacitance of the probe line, the capacitance at the input end of the probe line will be attenuated by 10 times (the handle is moved to 10X). At this time, the capacitance can be used for impedance matching with the bandwidth of 100MHz.Note that only probes with a bandwidth of 100 MHz or higher should be used. 1X measured 0-80Vpp voltage; 10X measured 0-800Vpp voltage.

# Product Introduction

This is a full-featured, highly practical, cost-effective handheld oscilloscope developed for people in the maintenance and R&D industries. It is suitable for home appliance inspection, automotive diagnostics, research and education, product development, utility testing and many other applications.

◆Waveform bandwidth up to 120MHz with an equivalent sampling rate of 500MSps.

◆Three waveform scanning modes (Auto, Normal, Single).

◆The waveform one key AUTO automatically adapts to the screen without adjusting parameters.

◆Waveform parameters such as time base, vertical Sensitivity, trigger edge, etc. can be set by yourself.

◆1kHz, 10kHz, 100kHz, 1MHz four-position square wave signal output.

◆Store up to 2500 waveforms, support thumbnail view, waveform delete and other functions.

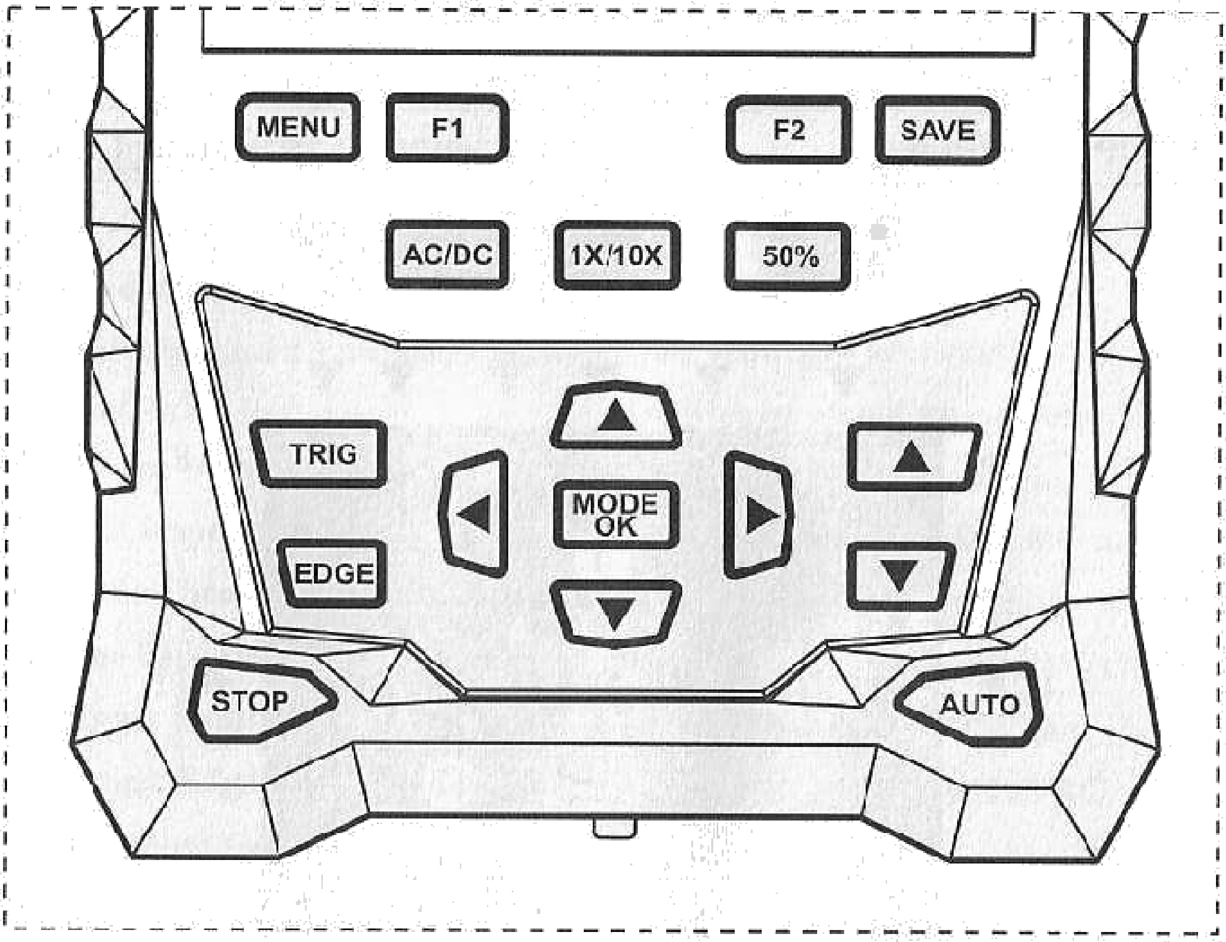
◆Built-in lithium battery for about 8 hours of use.

◆Compact size, light weight of about 180g, easy to carry.

◆320*240 HD color LCD, clear and accurate waveform.

◆Protective silicone covers on both sides of the instrument, slip-resistant, drop-resistant and shock-resistant, comfortable hand feel.

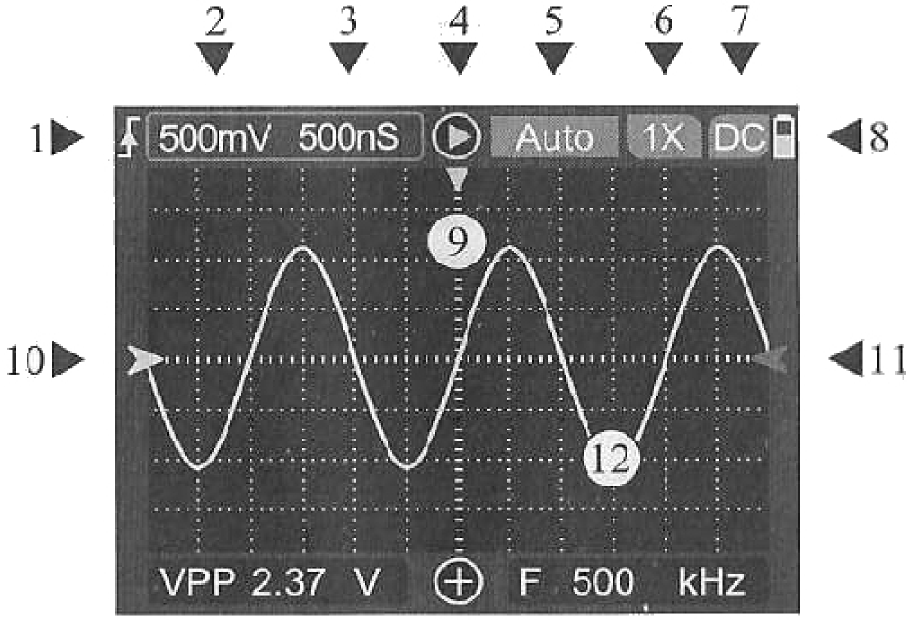
# Keypad Introduction




| | |
|---|---|
| MENU: Menu/Back | F1: Voltage parameters |
| F2: Time parameter | SAVE: Save Waveform |
| AC/DC: Input coupling | 1X/10X: Input magnification |
| 50%:Set the trigger voltage to the average value of the waveform | |
| TRIG: Trigger mode | EDGE: Trigger edge |
| ▲ : Waveform vertical scaling/Moving up the waveform | |
| ▼ : Waveform vertical zoom/Moving down the waveform | |
| ◀ : Waveform horizontal zoom/Moving left the waveform | |
| ▶ : Waveform horizontal scaling/Moving right the waveform | |

| | |
|---|---|
| MODE/OK: Waveform Scaling / Waveform Shifting / OK | |
| ▲ (Up Key of the right side): Increase trigger voltage | |
| ▼ (Down Key of the right side): Decrease trigger voltage | |
| STOP: Stop/Run | Auto: automatic adjustment |

## User interface




◆1: Trigger Edge.

◆2: Vertical sensitivity.

◆3: Horizontal Time Base.

◆4: Stop/Run indicator icon.

◆5: Trigger mode.

◆6: Input magnification.

◆7: Input coupling method.

◆8: Remaining power.

◆9: Waveform horizontal position.

◆10: Baseline indication.

◆11: Trigger voltage indication.

◆12: Measured signal waveform.

◆13: Voltage parameters, press F1 to switch VPP, VP, MAX,MIN AVG and RMS.

◆14: Directional keyboard mode
⊕ : Waveform scaling mode, ✢ : waveform shift mode).

◆15: Time parameter,press F2 to switch F, T, T+, T-, Du+ and Du- .

## Parameter indicators

◆**Product type**: Oscilloscope
◆**Screen size**: 2.4" color screen
◆**Screen resolution**: 320×240
◆**Display Technology**: TFT
◆**Waveform bandwidth**: 120MHz
◆**Equivalent max sampling rate**: 500MSa/S
◆**Storage Depth**: 12.8div
◆**Input impedance**: 1MΩ
◆**Vertical Sensitivity**: 50mV~100V
◆**Time base range**: 6nS~50S
◆**Trigger mode**: Auto/Normal/Single
◆**Trigger Edge**: Rising/Falling edge
◆◆**Input impedance**: 1MΩ
◆**One-click Auto**: Support
◆**Storage**: 2500 waveforms
◆**Waveform Manager**: Support
◆**Voltage accuracy**: 10%
◆**Frequency accuracy**: 1%
◆**Measurement parameter**: 12
◆**Battery**: Lithium battery
◆**Standby time**: About 8 hours
◆**Backlight brightness**: 1~8 levels
◆**Charging voltage**: DC5V/1A/2A
◆**Body size**: 124*80*35mm
◆**Coupling method**: DC/AC
◆**Maximum test voltage**: 1X: 80 Vpp ; 10X: 800 Vpp
◆**Signal Source Outputs**: 1kHz, 10kHz, 100kHz, 1MHz
◆**Accessories**: 100MHz Probe, Charging Cable, User Manual, Cloth bag

## Scaling/Shift mode

Click the **【MODE/OK】** key to switch between scaling mode and shift mode. The direction keys of different modes have different functions, and the corresponding mode icon is displayed at the bottom of the screen.

⊕:Waveform scaling mode, ▲/▼ keys to adjust vertical sensitivity, ►/◄ keys to adjust time base.

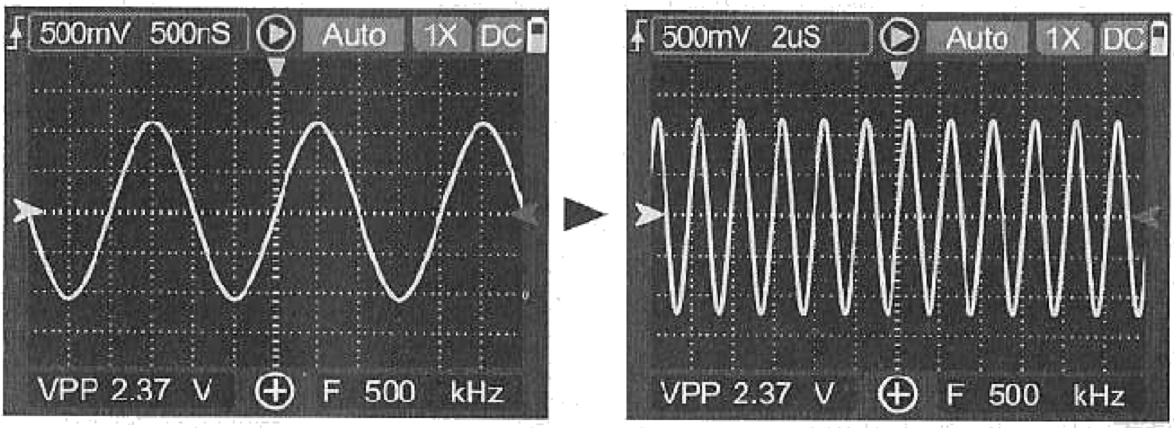
✥:Waveform shift mode, the waveform can be moved with the direction keys, however, the waveform can only move vertically in Single/Normal mode.

◆**Amplify the waveform:** Press the【MODE/OK】key to set the directional keyboard to scaling mode ⊕, press the【▼】down key to enlarge the waveform vertically, and press the【◀】left key to enlarge the waveform horizontally.

◆**Shrink the waveform:** Press the【MODE/OK】key to set the directional keyboard to scaling mode ⊕, press the【▲】up key to shrink the waveform vertically, and press the【▶】right key to shrink the waveform horizontally.

◆**To move the waveform:** Press the【MODE/OK】key to set the directional keyboard to shift mode ✣, press the directional key to move the waveform in the corresponding direction.

◆**Adjusting trigger voltage:** Press the【▲】and【▼】directional keys in the lower right corner to adjust the trigger voltage. Note that the "Auto 50%" function needs to be turned off first and that the time base range is between 25nS and 100mS.

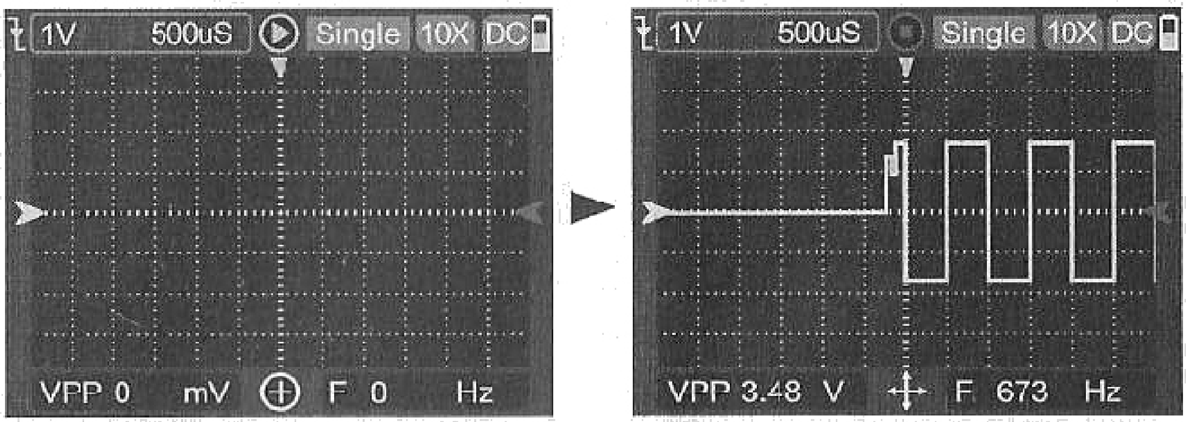



Example: Press the【▶】key to shrink the waveform horizontally.

◆**Trigger edge:** Press the【EDGE】key to switch the trigger rising and falling edges.

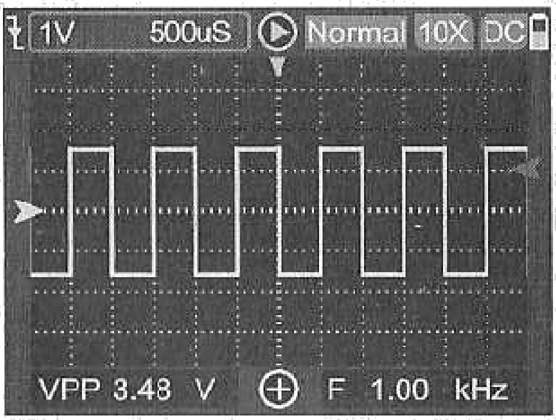
# Operating Instructions

◆**Single mode:** Press the 【**TRIG**】 key until "Single" is displayed. Adjust the trigger line according to the initial state signal, and then release the signal. When the oscilloscope collects the signal that meets the trigger condition, the frame signal will be automatically suspended. If another test is needed, press 【**STOP**】 to start the next frame sample.

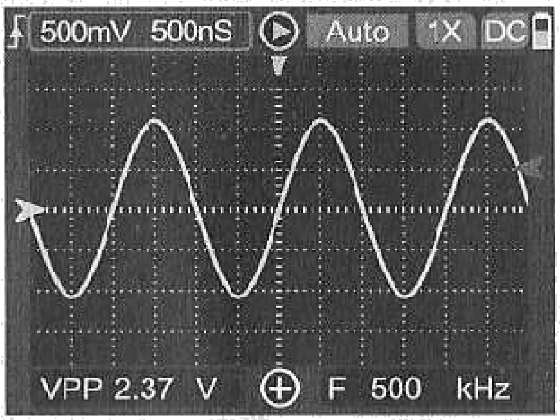



Auto acquire the first waveform that meets the trigger conditions

◆**Normal mode:** Press the 【**TRIG**】 key until "Normal" is displayed. The normal mode updates waveform when the input signal meets the trigger condition. For example, a burst signal can be captured with both single and normal mode, but single mode only captures the first waveform, while normal mode captures the last waveform.

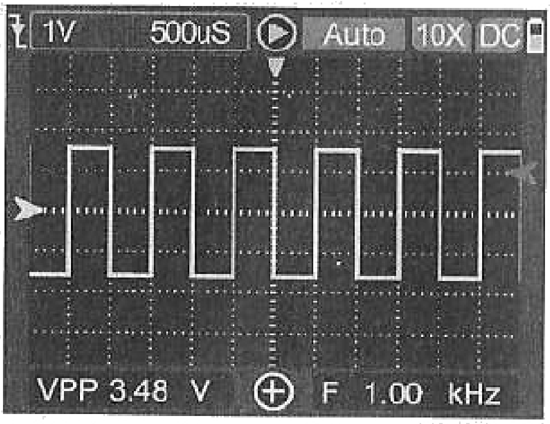


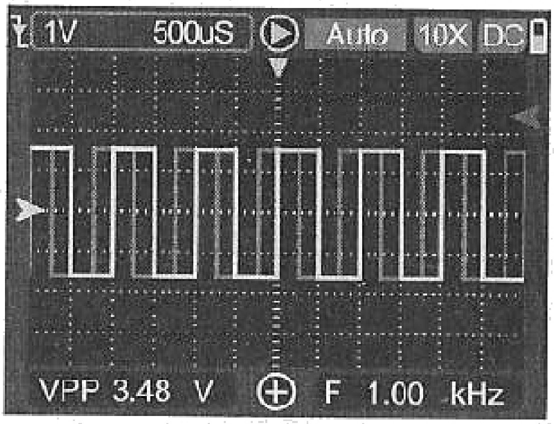

Acquired waveform




Newly acquired waveform

◆**Auto mode:** Press the 【TRIG】 key until "Auto" is displayed. Auto mode is mainly used to measure periodic signals, such as sine waves, square waves, clock waves, PWM waves, etc. The waveform will be updated all the time whether the signal meets the trigger condition or not, but the waveform is synchronized when the trigger conditions are met.



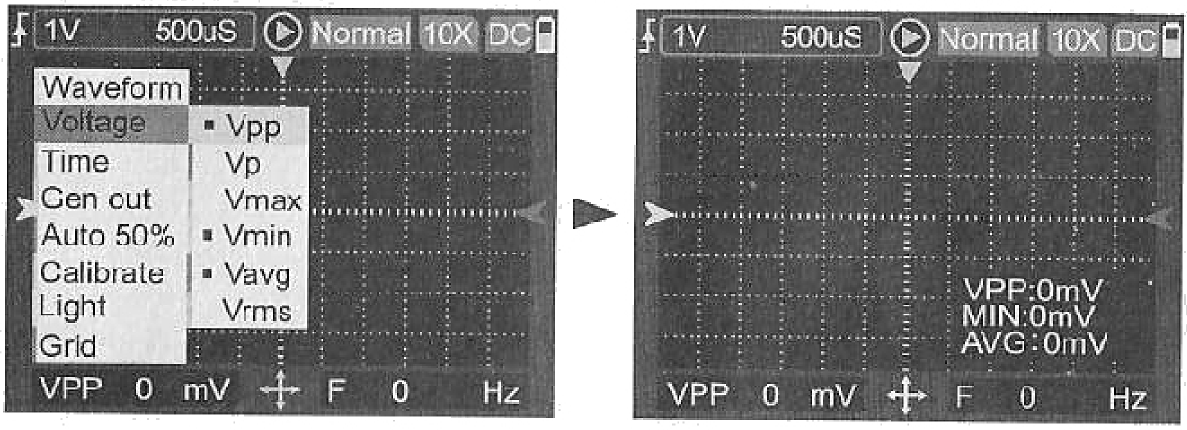

The waveform will be updated all the time.

◆**Input coupling method:** Press the 【AC/DC】 key to switch the AC or DC coupling method.

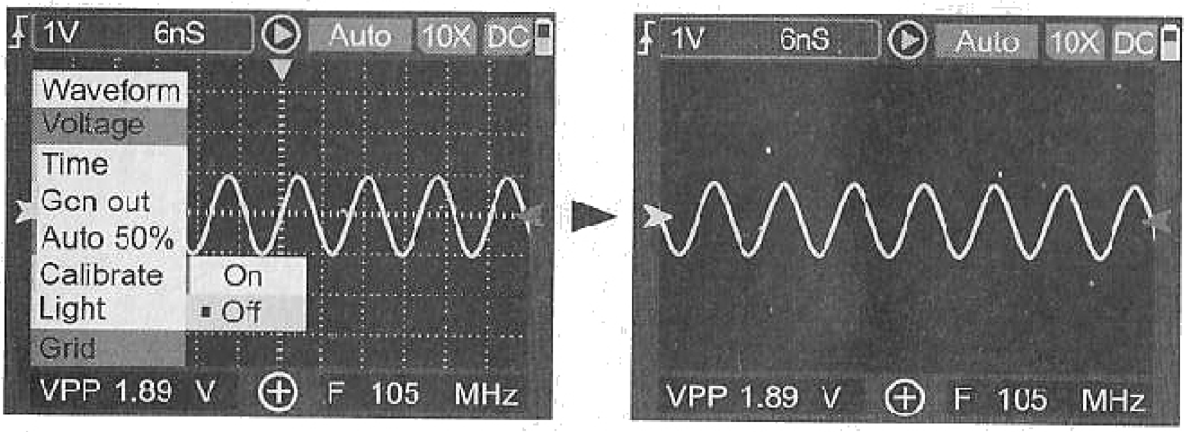
◆**Input magnification:** the probe handle on the magnification switch toggle to the appropriate position, and then press the oscilloscope 【1X/10X】 key to switch to the corresponding input magnification, so that the probe handle and oscilloscope have the same magnification.

◆**STOP/RUN:** Press the 【STOP】 key to stop/run the waveform display.

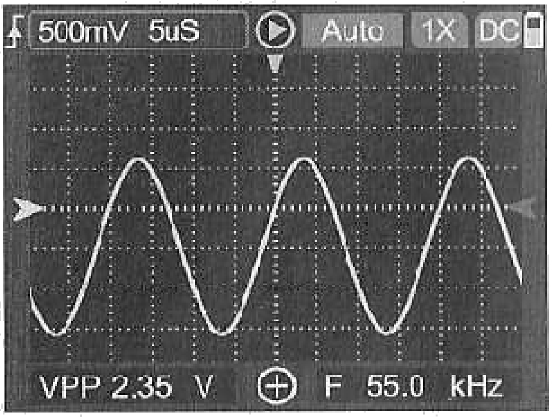
◆**Show/hide the measurement parameters:** Press【MENU】key to enter the main menu, select "Voltage" or "Time", then press【MODE/OK】key to enter the sub-menu, select the parameters press【MODE/OK】key to confirm, then press【MENU】key to exit the menu to display the selected parameters, the front of the black dot indicates the location of the current parameters are being displayed, up to 12 measurement parameters can be displayed.

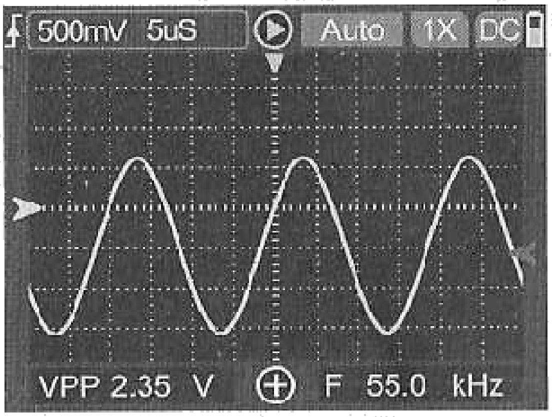



◆**Show/hide the background grid:** Press【MENU】key to enter the main menu, select "GRID", then press【MODE/OK】to enter the sub-menu, after setting is complete, press【MODE/OK】key to confirm, and then press the【MENU】key to exit the menu to take effect. The position indicated by the black dot in front represents the current setting.

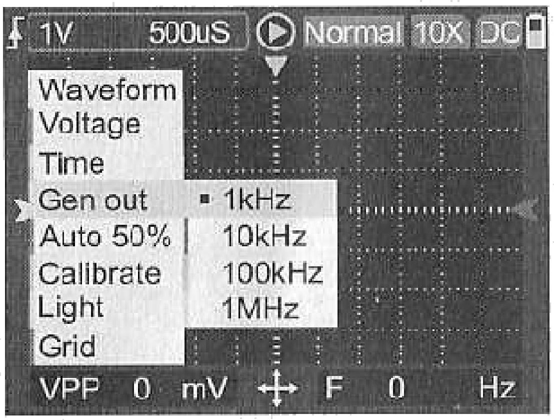


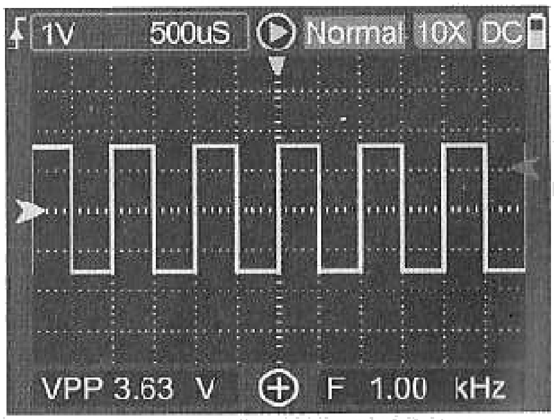
◆**Set auto 50% trigger:** Press【MENU】key to enter the main menu, select "Auto 50%", then press【MODE/OK】key to enter the sub-menu, the setting is complete, press【MODE/OK】key to confirm, and then press the【MENU】key to exit the menu to take effect. The position indicated by the black dot in front represents the current setting. In the Auto mode, the trigger voltage of each measurement is half of the peak value of the waveform.




◆**Signal source output:** Press【MENU】key to enter the main MENU, select "Gen Out", press【MODE/OK】key to enter the sub-menu, select the output frequency, press【MODE/OK】key to confirm, and then press【MENU】key to exit the menu to take effect. Hook the probe into the signal output ring to see the waveform output by the signal source.



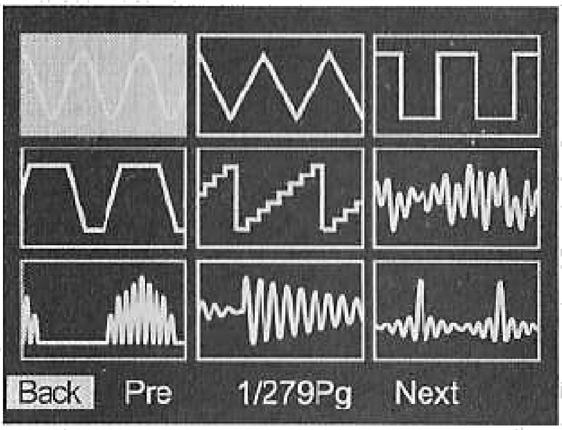
## Operating Instructions

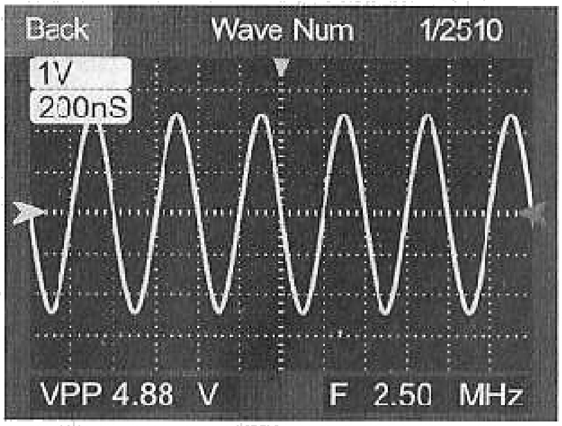
◆**Save waveform:** Press the【SAVE】 key to save the current signal waveform and other measurement data, such as vertical sensitivity and time base.

◆**View the saved waveform:** Press the【MENU】 key to enter the main menu, select "Waveform", then press the【MODE/OK】key to enter the waveform file manager, which supports thumbnail view of the waveform. After selecting the waveform to be viewed, press the【MODE/OK】key to view it in full screen, and then press the【MODE/OK】key to display the vertical sensitivity, time base and background grid lines.

◆**To delete the saved waveform:**Press the【AUTO】key and then press the【MODE/OK】key to delete the selected waveform. Press the【STOP】key to delete all waveforms.

◆**Waveform Manager Page Flip:**In the thumbnail view interface, press【F1】to page forward, press【F2】to page backward.



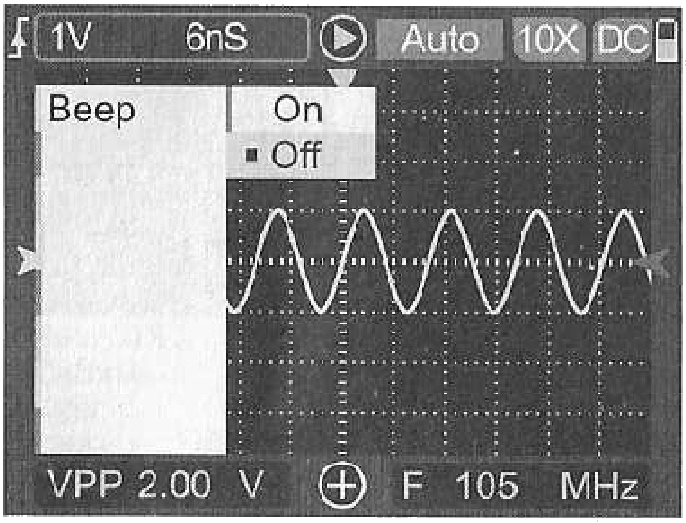



◆**Horizontal baseline deviation calibration:**Press the 【MENU】 key to enter the main menu, select "Calibrate", and then press the 【MODE/OK】 key to calibrate. The probe and USB cable must be unplugged before calibration.

◆**Adjust the screen brightness:**Press 【MENU】 key to enter the main menu, select "Light", then press 【MODE/OK】 key to enter the sub-menu, select the appropriate brightness and press 【MODE/OK】 key to take effect.

◆**Set the scrolling mode:**Use the scrolling mode when observing very slowly changing signal levels, switch to the zoom mode of the waveform by pressing the 【MODE/OK】 button and then increase the time base to 500mS~50S.

◆**Set the key tone:**press the 【MENU】 key to enter the main menu, select "sound", press the 【MODE/OK】 key to enter the sub-menu, select on/off and press the 【MODE/OK】 key to confirm, then press 【MENU】 key to exit the menu to take effect. The position indicated by the black dot in front represents the current setting.



## Probe check

When connecting the probe to an oscilloscope, make this adjustment first to match the probe to the input channel. An uncompensated or biased probe can cause measurement errors or mistakes.

1、Press **【MENU】** key to enter the main menu, select "Gen Out" and then press **【MODE/OK】** key to enter the sub-menu, select "1KHz" and then press **【MODE/OK】** key to confirm, and then press **【MENU】** key to exit and to take effect.

2、Press the **【1X/10X】** key to set probe attenuation to 10X. Connect the BNC end of the probe to the oscilloscope and set the switch on the probe to 10X, then hook the probe into the ring of the oscilloscope and press the **【AUTO】** button.

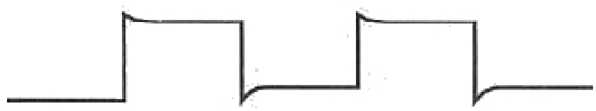
3、Check the shape of the display waveform, and if necessary, adjust the variable capacitance on the probe with a non-metallic screwdriver until the waveform displayed on the screen is "properly compensated" as shown in the figure below.



Properly compensated



Under-compensation



Overcompensation

## Failure analysis

**◆1. Can't turn on and get a full charge?**

The power may have run out, please use a charger with 5V/1A or higher to charge the battery before turning on the machine. Do not charge with the computer USB, it cannot be fully charged when the power is low.

**◆2. The test didn't form a waveform and there was only one line on the screen that didn't move?**

Please check whether the press 【STOP】 key to suspend the display of the waveform, please press 【STOP】 key again to refresh the waveform display, if not, press 【AUTO】 key, if there is still no waveform, the input signal source may be no signal output, may also be a short circuit or broken probe line, please use a multimeter to check whether the probe and the signal source is normal.

**◆3. Why is the voltage value data 0?**

Please adjust the vertical sensitivity and time base (sampling rate) until the screen shows a clear and complete periodic waveform with the top and bottom of the waveform completely displayed on the screen, then the correct measured voltage value data is displayed.

**◆4. Why is the frequency value data 0?**

Make sure the trigger mode is Auto and the time base range is between 6nS and 200mS, then adjust the vertical sensitivity and time base (sampling rate) until the screen shows a clear and complete periodic waveform, and the waveform is triggered (the red arrow indicates the position between the top and bottom of the waveform, fixed and not shaking), then the correct measured frequency data will be displayed.

**◆5. Why is the duty cycle 0?**

After ensuring that the trigger mode is Auto and the time base range is between 6nS and 200mS, adjust the trigger line between the waveforms, the waveforms will be fixed and the screen will display a clear and complete periodic waveform, then the correct duty cycle data will be displayed.

**◆6. Is the AC coupling the same as the DC coupling waveform?**

When symmetric AC signal (Signal output from signal generator or household 220V AC) is input under normal circumstances, the AC coupling waveform is the same as the DC coupling waveform. The waveform only moves up and down when the coupling is switched by an asymmetric AC signal or a pulsating DC signal.

**◆7. See no waveform, just multiple lines jumping up and down?**

Set the trigger mode to "Auto" and press the 【**AUTO**】 key to automatically adapt the waveform, if this does not solve the problem, it may be that the clamp on the probe is not grounded, or the probe clamp end is disconnected, please use a multimeter to check whether the probe is normal.

**◆8. Waveform wobbles around and can't be fixed ?**

Please adjust the trigger voltage: In the trigger mode, press the 【▲】 and 【▼】 keys at the bottom right until the red arrow is adjusted between the top and bottom of the waveform, then the waveform will be triggered and fixed; or turn on automatic 50% trigger ( Please see page 10 for specific operations).

**◆9. Can't capture pulse waveforms, or digital logic signals?**

Press 【TRIG】 to enter Single mode or Normal mode, and then adjust the trigger voltage so that the red arrow can be adjusted between the waveform to capture the corresponding waveform.

**◆10. No waveform when measuring batteries or other DC voltages?**

The battery voltage signal is a stable DC signal, when the AC coupling, the DC signal is isolated, no matter how to adjust there is no waveform, when the DC coupling, AC and DC signals are allowed to pass, adjust the vertical sensitivity, there will be up or down deviation of the linear waveform.

**◆11. Is there a deviation between the baseline and the left arrow when there is no signal input?**

After unplug the probe and USB cable, press 【MENU】 to enter the main MENU, select "Calibrate" and conduct horizontal baseline deviation calibration.

**◆12. Significant voltage degradation when measuring signals above 5 MHz?**

When measuring the waveform above 5MHz, the probe should be moved to the 10X gear and the oscilloscope should also be set to the 10X input mode. Since the capacitance of the oscilloscope probe line is as high as 100 ~ 300pF, when the signal passes through the probe and reaches the input end of the oscilloscope, it will be greatly attenuated with the equivalent bandwidth of 5MHz. In order to match the capacitance of the probe line, the capacitance at the input end of the probe line will be attenuated by 10 times.